

## WHAT IS CLAIMED IS:

1. An apparatus for determining leakage in an evaporated fuel processing system, the evaporated fuel processing system extending from a fuel tank through a canister to a purge passage through which evaporated fuel from the fuel tank is purged to an intake manifold of an engine, the canister comprising a vent-shut valve that communicates with the atmosphere, the apparatus comprising:
  - a pressure sensor for detecting a pressure of the evaporated fuel processing system;
  - a control unit connected to the pressure sensor, the control unit configured to:
    - detect a stop of the engine;
    - close the vent-shut valve to close the evaporated fuel processing system after the stop of the engine is detected;
    - determine whether the evaporated fuel processing system has leakage after the evaporated fuel processing system is closed based on the detected pressure and a predetermined determination value; and
    - prohibit the leakage determination if the detected pressure is not within a predetermined range.
2. The apparatus of claim 1, wherein the predetermined range is based on a pressure range within which the vent-shut valve can open.
3. The apparatus of claim 2, wherein the pressure range within which the vent-shut valve can open is based on a biasing force of a spring of the vent-shut valve.

4. The apparatus of claim 3, wherein the spring of the vent-shut valve is provided in the atmosphere side relative to a valve seat at which the vent-shut valve is seated,

wherein the control unit is further configured to:

5                   prohibit the leakage determination if the detected pressure is greater than a predetermined positive pressure.

5. The apparatus of claim 3, wherein the spring of the vent-shut valve is provided in the canister side relative to a valve seat at which the  
10 vent-shut valve is seated,

wherein the control unit is further configured to:

                  prohibit the leakage determination if the detected pressure is lower than a predetermined negative pressure.

15 6. A method for determining leakage in an evaporated fuel processing system, the evaporated fuel processing system extending from a fuel tank through a canister to a purge passage through which evaporated fuel from the fuel tank is purged to an intake manifold of an engine, the canister comprising a vent-shut valve that communicates with the atmosphere,  
20 comprising the steps of:

                  detecting a pressure of the evaporated fuel processing system;

                  detecting a stop of the engine;

                  closing the vent-shut valve to close the evaporated fuel processing system after the stop of the engine is detected;

25                   determining whether the evaporated fuel processing system has leakage after the evaporated fuel processing system is closed based on the detected pressure and a predetermined determination value; and

                  prohibiting the leakage determination if the detected pressure is not within a predetermined range.

7. The method of claim 6, further comprising the step of defining the predetermined range based on a pressure range within which the vent-shut valve can open.

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8. The method of claim 7, further comprising the step of defining the pressure range within which the vent-shut valve can open based on a biasing force of a spring of the vent-shut valve.

10 9. The method of claim 8, wherein the spring of the vent-shut valve is provided in the atmosphere side relative to a valve seat at which the vent-shut valve is seated,

wherein the step of prohibiting the leakage determination further comprises the step of prohibiting the leakage determination if the detected  
15 pressure is greater than a predetermined positive pressure.

10. The method of claim 8, wherein the spring of the vent-shut valve is provided in the canister side relative to a valve seat at which the vent-shut valve is seated,

20 wherein the step of prohibiting the leakage determination further comprises the step of prohibiting the leakage determination if the detected pressure is lower than a predetermined negative pressure.

11. A computer program stored on a computer readable medium for use  
25 in determining leakage in an evaporated fuel processing system, the evaporated fuel processing system extending from a fuel tank through a canister to a purge passage through which evaporated fuel from the fuel tank is purged to an intake manifold of an engine, the canister comprising a vent-shut valve that communicates with the atmosphere, the computer

program comprising:

program code for receiving a pressure of the evaporated fuel processing system from a pressure sensor;

program code for detecting a stop of the engine;

5 program code for closing the vent-shut valve to close the evaporated fuel processing system after the stop of the engine is detected;

program code for determining whether the evaporated fuel processing system has leakage after the evaporated fuel processing system is closed based on the detected pressure and a predetermined determination value; and

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program code for prohibiting the leakage determination if the detected pressure is not within a predetermined range.

12. The computer program of claim 11, wherein the predetermined range is based on a pressure range within which the vent-shut valve can open.

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13. The computer program of claim 12, wherein the pressure range within which the vent-shut valve can open is based on a biasing force of a spring of the vent-shut valve.

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14. The computer program of claim 8, wherein the spring of the vent-shut valve is provided in the atmosphere side relative to a valve seat at which the vent-shut valve is seated,

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wherein the program code for prohibiting the leakage determination further comprises program code for prohibiting the leakage determination if the detected pressure is greater than a predetermined positive pressure.

15. The computer program of claim 8, wherein the spring of the

vent-shut valve is provided in the canister side relative to a valve seat at which the vent-shut valve is seated,

wherein the program code for prohibiting the leakage determination further comprises program code for prohibiting the leakage determination  
5 if the detected pressure is lower than a predetermined negative pressure.

16. An apparatus for determining leakage in an evaporated fuel processing system, the evaporated fuel processing system extending from a fuel tank through a canister to a purge passage through which evaporated  
10 fuel from the fuel tank is purged to an intake manifold of an engine, the canister comprising a vent-shut valve that communicates with the atmosphere, the apparatus comprising:

a pressure sensor for detecting a pressure of the evaporated fuel processing system;

15 means for detecting a stop of the engine;

means for closing the vent-shut valve to close the evaporated fuel processing system after the stop of the engine is detected;

means for determining whether the evaporated fuel processing system has leakage after the evaporated fuel processing system is closed  
20 based on the detected pressure and a predetermined determination value;  
and

means for prohibiting the leakage determination if the detected pressure is not within a predetermined range.

25 17. The apparatus of claim 16, wherein the predetermined range is based on a pressure range within which the vent-shut valve can open.

18. The apparatus of claim 17, wherein the pressure range within which the vent-shut valve can open is based on a biasing force of a spring of the

vent-shut valve.

19. The apparatus of claim 18, wherein the spring of the vent-shut valve is provided in the atmosphere side relative to a valve seat at which  
5 the vent-shut valve is seated,

wherein the means for prohibiting the leakage determination further comprises means for prohibiting the leakage determination if the detected pressure is greater than a predetermined positive pressure.

- 10 20. The apparatus of claim 18, wherein the spring of the vent-shut valve is provided in the canister side relative to a valve seat at which the vent-shut valve is seated,

wherein the means for prohibiting the leakage determination further comprises means for prohibiting the leakage determination if the  
15 detected pressure is lower than a predetermined negative pressure.